CHRONIC obstructive pulmonary disease (COPD) is characterized by chronic cough, sputum production, and a change of baseline dyspnea as lung function declines.1 More than 15 million US adults are diagnosed with COPD, which is one of the leading causes of morbidity and mortality.1 As one of the top causes...
KEY POINTS

- Inadequate treatment of chronic obstructive pulmonary disease (COPD) leads to worsening exacerbations and disease severity, which greatly increase direct medical costs.
- This retrospective cohort study evaluated prescription fills for COPD medications, especially long-acting bronchodilators (LABDs), in hospitalized elderly patients.
- Many patients hospitalized for COPD were not prescribed or were not filling the guideline-recommended medications to manage their disease.
- LABDs should be initiated posthospitalization for COPD, but the use of LABDs in this study was low, despite a modest increased use of LABDs from preto posthospitalization.
- Patients who did not fill a prescription for an LABD or at least 1 COPD medication before hospitalization were less likely to fill such a prescription posthospitalization.
- Patients who filled a prescription for an ICS as a maintenance therapy before hospitalization were negatively associated with filling an LABD prescription posthospitalization.
- Elderly patients with COPD, especially those who receive first-line therapy, must be educated on the importance of filling and using their prescriptions.

Methods

This retrospective cohort study included elderly patients with COPD enrolled in Cigna-HealthSpring Medicare Advantage plans in Texas. At the time of this study, Cigna-HealthSpring had approximately 120,000 beneficiaries across Texas. The Medicare Advantage plans were categorized as Cigna-HealthSpring Total Care, which covered beneficiaries who were eligible for Medicare and Medicaid, and Cigna-HealthSpring Advantage plans, which covered beneficiaries who were eligible for Medicare only.

All the Medicare Advantage plans covered hospital (Part A) and medical (Part B) visits, with the exception of hospice, emergency and urgent care, and Medicare prescription drugs (Part D). Deidentified administrative claims data between January 1, 2011, and December 31, 2014, were retrieved from the Medicare Advantage plans’ membership and member summary file, and the institutional, professional, and pharmacy claims were provided by the pharmacy benefits manager (Argus/SXC).

Member files included data on demographics, membership coverage dates, and Centers for Medicare & Medicaid Services (CMS) risk score, as well as monthly
Figure 1 Study Design

Identification period: First (index) hospitalization for COPD

01/01/2012 03/31/2014

Index hospitalization

Preindex period: 180 days preindex admission date

01/01/2012

Postindex period: 180 days postindex discharge date

12/31/2014

Length of hospital stay + grace period

COPD indicates chronic obstructive pulmonary disease.

summarizes of inpatient and outpatient visit costs, including Part B and Part D medication costs paid by the plans. The institutional claims provided information on all inpatient claims. The diagnostic information was in the form of International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes, and the procedure information was in the form of Current Procedural Terminology codes.

The professional claims file provided information on all outpatient encounters. The pharmacy claims contained detailed information on each member’s prescription fill (Part D), including the drug’s National Drug Code, generic and brand-name, prescription fill date, quantity dispensed, days’ supply, members’ out-of-pocket costs for the prescription, and the amount paid by the plan. The pharmacy claims did not capture medications covered by Part B.

This study was approved by the Institutional Review Board at the University of Houston.

Patients who had a first (ie, index) hospitalization with a primary diagnosis of COPD (ICD-9-CM codes 491.xx chronic bronchitis, 492.xx emphysema, and 496.xx chronic airway obstruction not elsewhere classified) between January 1, 2012, and March 31, 2014, were identified from the institutional claims. To evaluate COPD medication fills before and after the index hospitalization, considering that discharged elderly patients with COPD are often stabilized for 30 to 90 days before resuming their regular medication schedules, and the inability to capture medication use in the inpatient setting, a 180-day window was used to capture the patients’ prescription drug use.

The preindex period was defined as the 180 days before the index admission date, and the postindex period as the 180 days after the index discharge date (Figure 1). For patients who filled a COPD prescription close to the index discharge date and the days supplied extended beyond that date, a gap period was calculated using the date of service plus the days supplied minus the index discharge date. A grace period was considered for these patients by adding the gap period to the 180-day window after the index discharge date. Other patient characteristics, such as demographics and comorbidities, were evaluated during 12 months before the index admission date, except for COPD medication prescription fills.

To be eligible for the analysis, patients who had an index hospitalization must not have had additional hospitalizations within the postindex period, had to be alive, and must not have received hospice care before 180 days after the index discharge date. Patients also had to have at least 1 outpatient diagnosis of COPD before the index admission date, be enrolled continuously in the Medicare Advantage plan for at least 12 months before and 9 months after the index admission date, and be aged ≥65 years on the index admission date.

COPD medications and a group that did not receive COPD medication. The grouping by LABD prescription fills was based only on whether a patient filled a prescription for an LABD and did not exclude patients who filled a prescription for other types of COPD medications. Patients in the LABD and no LABD groups could or could not be filling prescriptions for other types of COPD medications during the 180-day postindex period.

Therefore, patients in the COPD medication group included patients from the LABD group, and patients in
the no COPD medication group were also included in the no LABD group.

To understand whether and how a patient’s treatment changed before and after the index hospitalization, the prescription fills for COPD medications within the preindex and postindex periods were tabulated by each drug class. Because the GOLD guidelines recommended that LABDs be initiated after a patient has a COPD exacerbation that leads to hospitalization, we evaluated the factors that were associated with filling an LABD prescription during the postindex period. Because patients who did not fill an LABD after the index date might have taken other COPD medications, and to further understand how patient characteristics could affect their COPD medication filling, we evaluated the predictors for filling any COPD medications during the postindex period.

**Measures**

The COPD medications included in this study are listed in Table 1. The number of different types of COPD medications filled by patients during the pre- and postindex periods were also evaluated.

The patients’ other characteristics, including demographics and comorbidities, were examined within a 12-month baseline period (Table 2). The patients’ demographics included age, sex, health plan type (Total Care vs Medicare Advantage beneficiaries), and member county. The proxies for a patient’s overall health were evaluated in terms of comorbidities at baseline, Deyo’s version of Charlson Comorbidity Index (CCI), and the CMS risk score. The CCI uses 17 categories of comorbidities to calculate a score that reflects the cumulative increased likelihood of 1-year mortality. The CCI is based on ICD-9-CM diagnoses and procedure codes and their associated weights. A higher CCI indicates a greater risk for mortality and disease burden. The CMS risk score is based on patient demographics, Medicaid eligibility, and health status that accounts for factors representing overall health that are not reflected by the CCI.

**Statistical Analysis**

Descriptive statistics were used to summarize the characteristics of the patients in the COPD medication group versus the no COPD medication group and the LABD group versus the no LABD group. t-tests and the Wilcoxon rank-sum test were used to compare the continuous variables of mean age, CCI, and CMS risk score. Chi-square and Fisher’s exact tests were used to compare the categorical variables, including age category, sex, type of health plan, member county, history of comorbidities (eg, congestive heart failure [CHF], chronic kidney diseases, cerebral vascular disease), categorical CCI, and the number of different types of COPD medications filled by patients within 180 days before the index admission.

McNemar’s tests were used to compare the proportions of patients who filled or did not fill the same type of COPD medication during the pre- and postindex periods. Stepwise logistic regression was used to determine the baseline predictors for filling an LABD prescription, as well as a prescription for any COPD medication during the postindex period.

A significance level of 0.20 was required to allow a variable into the model, and a significance level of 0.10 was required for a variable to stay in the model. Statistical significance of univariate and adjusted analyses were tested 2 sided at \( P < .05 \). All analyses were performed using SAS statistical software version 9.4 (SAS Institute, Inc; Cary, NC).

**Results**

A total of 6054 patients were identified who had a first (ie, index) hospitalization with a primary diagnosis of COPD and who were not hospitalized again within the postindex period (Figure 1). After imposing the inclusion and exclusion criteria, a total of 1352 beneficiaries were eligible for the analysis. The mean age was 75 years, approximately 52% of the patients were male, and approximately 53% were residing in the southern Texas region (Table 2). The age, sex, and county residency of the beneficiaries were similar between the LABD and no LABD groups as well as between the COPD medication and no COPD medication groups.

Within the postindex period, 165 (12%) patients were categorized into the LABD group and 1187 (88%) were grouped into the no LABD group (Appendix Figure). A greater proportion of patients in the LABD group

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**Table 1 List of Medications for COPD**

<table>
<thead>
<tr>
<th>Drug type</th>
<th>Drugs</th>
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<tbody>
<tr>
<td><strong>Long-acting bronchodilators</strong></td>
<td>LABAs: Arformoterol, indacaterol, olodaterol, formoterol, and salmeterol</td>
</tr>
<tr>
<td></td>
<td>LAMAs: Aclidinium and tiotropium</td>
</tr>
<tr>
<td><strong>Dual fixed-dose combinations</strong></td>
<td>ICS/LABA: budesonide/formoterol, fluticasone/salmeterol, fluticasone/vilanterol</td>
</tr>
<tr>
<td></td>
<td>LABA/LAMA: vilanterol/umecnidinium</td>
</tr>
<tr>
<td><strong>Short-acting bronchodilators</strong></td>
<td>Albuterol, levosalbuterol, metaproterenol, ipratropium, albuterol/ipratropium</td>
</tr>
<tr>
<td><strong>ICSs</strong></td>
<td>Budesonide, beclometasone, flunisolide, fluticasone, tramcinolone spray</td>
</tr>
<tr>
<td><strong>Leukotriene modifiers</strong></td>
<td>Zileuton, montelukast</td>
</tr>
<tr>
<td><strong>PDE-4 inhibitors</strong></td>
<td>Roflumilast</td>
</tr>
</tbody>
</table>

COPD indicates chronic obstructive pulmonary disease, ICS, inhaled corticosteroid; LABA, long-acting beta agonist; LAMA, long-acting muscarinic antagonist; PDE-4, phosphodiesterase-4.
were enrolled in a Total Care plan (29.1% vs 20.6%; P < .05), had CHF (6.1% vs 3.6%; P < .05), and had a CCI score of 1 or 2 (11.5% vs 5.2%; P < .001) compared with the no LABD group (Table 2).

In a separate comparison, 350 (26%) patients filled any prescription for a COPD medication within the postindex period (Table 2). The COPD medication group was more likely than the no COPD medication group to have CHF (4.9% vs 2.4%; P < .05), a CCI score of 1 or 2 (8% vs 4.1%; P < .01), and a higher mean CMS risk score (1.7 vs 1.5; P < .01). During the preindex period, 7% of patients with
COPD filled a prescription for 1 type of COPD medication and 6.2% of patients filled a prescription for ≥2 types. After the index hospitalization, the percentages increased to 11.8% of patients who filled a prescription for 1 type of COPD medication and to 14.1% for 2 or more types (Table 2). More patients filled a prescription for at least 2 types of COPD medications in the LABD group than in the no LABD group (20.6% vs 4.2%; P <.0001), as well as in the COPD medication group versus the no COPD medication group (15.1% vs 3.1%; P <.0001). After the index hospitalization, the proportion of patients who filled a prescription for at least 2 types of COPD medications increased to 22.8% (P <.0001).
COPD medication increased to 79.4% in the LABD group, which was significantly higher than 5% in the no LABD group (P <.0001).

Table 3 shows how the prescription fill patterns changed from the pre- to postindex periods by drug category, including LABD (LABA, LAMA, and dual fixed-dose combinations), SABD, ICSs, leukotriene modifiers, PDE-4 inhibitors, and no COPD medications. A total of 1173 (86.8%) patients did not fill a prescription for any COPD medication during the preindex period, which decreased to 1002 (74.1%) in the postindex period. A total of 928 (68.6%) of the included elderly patients with COPD did not fill any COPD prescription during the preindex or postindex period.

The majority of patients who filled any prescription for LABDs filled a fixed-dose combination during the preindex (58 of 85; 68%) and postindex (119 of 165; 72%) periods. Among the 58 patients who filled a prescription for at least 1 fixed-dose combination in the preindex period, 20 did not fill a prescription for any COPD medication during the postindex period, whereas 31 filled a prescription for a fixed-dose combination drug, 8 filled a LAMA, 19 filled an SABD, 24 filled an ICS, 10 filled a leukotriene modifier, and 1 filled a PDE-4 inhibitor (Table 3). These numbers did not add up to 100%, because patients can fill a prescription for more than 1 type of COPD medication.

Comparing the proportions of patients who filled a prescription for the same type of COPD medication within our cohort during the pre- and postindex periods, McNemar’s tests indicated that the proportions who filled for LABDs and any COPD medications were significantly different (P <.0001). Specifically, within the category of LABDs, a greater proportion of patients filled for a LAMA (P <.0001) and fixed-dose combination drug (P <.0001) in the postindex date than in the preindex date. Similarly, a larger proportion of patients

<table>
<thead>
<tr>
<th>Table 3 Prescription Fill Patterns for COPD Medications by Category within 180-Day Pre- and Postindex Periods</th>
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</thead>
<tbody>
<tr>
<td>Prescription filled within 180-day preindex, N (%)</td>
</tr>
<tr>
<td>LABD, 85 (6.3)</td>
</tr>
<tr>
<td>LABA, 2 (0.2)</td>
</tr>
<tr>
<td>LAMA, 34 (2.5)</td>
</tr>
<tr>
<td>Dual fixed-dose combinations, 58 (4.3)</td>
</tr>
<tr>
<td>LABD, 82 (6.1)</td>
</tr>
<tr>
<td>ICS, 101 (7.5)</td>
</tr>
<tr>
<td>Leukotriene modifier, 21 (1.6)</td>
</tr>
<tr>
<td>PDE-4 inhibitor, 2 (0.2)</td>
</tr>
<tr>
<td>No COPD medication, 1170 (86.8)</td>
</tr>
</tbody>
</table>

Numbers do not add up to 100% because patients can fill more than 1 type of COPD medication.

COPD indicates chronic obstructive pulmonary disease; ICS, inhaled corticosteroid; LABA, long-acting beta agonist; LABD, long-acting bronchodilator; LAMA, long-acting muscarinic antagonist; PDE-4, phosphodiesterase-4; SABD, short-acting bronchodilator.

<table>
<thead>
<tr>
<th>Table 4 Stepwise Logistic Regression Analysis Predicting Odds of Filling a Prescription for LABD or for Any COPD Medication within 180 Days Postindex Discharge Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>Charlson Comorbidity Index</td>
</tr>
<tr>
<td>Number of different types of COPD medications filled within 180 days preindex admission</td>
</tr>
<tr>
<td>1 vs 0</td>
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<tr>
<td>≥2 vs 0</td>
</tr>
<tr>
<td>Use of LABD within 180 days preindex admission</td>
</tr>
<tr>
<td>Use of ICS within 180 days preindex admission</td>
</tr>
<tr>
<td>CMS risk score</td>
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</tbody>
</table>

*Predictors entered into the model included a patient’s age at index hospitalization; sex; Charlson Comorbidity Index; CMS risk score; health plan type; binary variables indicating prescription fills for SABD, ICS, and LABD within 180 days preindex admission; categorical variable indicating number of different types of COPD medications filled within 180 days preindex admission (0, 1, or ≥2); and binary variables indicating comorbid congestive heart failure and renal disease at baseline. CI indicates confidence interval; CMS, Centers for Medicare & Medicaid Services; COPD, chronic obstructive pulmonary disease; ICS, inhaled corticosteroid; LABD, long-acting bronchodilator; SABD, short-acting bronchodilator.
Medication Use Before & After Hospitalization for COPD

fillmed for any SABD, ICS, and leukotriene modifier during the postindex period compared with the preindex period (P < .0001).

The predictors for prescriptions filled for any LABD and any COPD medication during the postindex period, their respective odds ratios, and 95% confidence intervals are listed in Table 4. Patients with a higher CCI (2.27) who filled a prescription for 1 (3.76) or ≥ 2 (4.53) types of COPD medications versus no COPD medication during the preindex period, or filled a prescription for an LABD (3.61), were more likely to fill a prescription for an LABD in the postindex date, whereas those who had a prescription fill for an ICS during the preindex period were less likely to have a prescription fill for an LABD in the postindex date. Only 2 characteristics—a higher CCI (P < .05) and filling a prescription for at least 1 type of COPD medications versus no COPD medications during the preindex period (P < .0001)—were significantly associated with filling any COPD medication prescription during the postindex period while controlling for CMS risk score.

Discussion

Our study indicates that patient prescription fills for LABDs and other COPD medications increased after the index hospitalization (Table 3). By contrast, the results also show that the use of COPD medications, especially LABDs, were low in the cohort of elderly patients with COPD who were enrolled in Medicare Advantage plans. Of the entire cohort, approximately 69% of patients did not fill any COPD medication overall during the pre- and postindex periods.

Bivariate analyses and stepwise logistic regression suggest that patients who had greater comorbidity burden tended to fill an LABD prescription after hospitalization, whereas patients who did not fill any COPD medication prescription before hospitalization were less likely to fill a prescription after hospitalization. However, filling a prescription for an ICS before hospitalization was significantly associated with not filling an LABD prescription, but was not associated with filling any COPD medication prescription after hospitalization.

Because the GOLD guidelines recommended the use of LABDs after the exacerbation of COPD as early as 2012, our findings may reflect the prescription fill patterns during the initial 2 years after the guidelines came out. Almost 70% of patients in our study did not have a pharmacy claim for COPD medications during the pre- and postindex periods. These results were consistent with previous findings that the use of SABDs, ICSs, LABDs, and dual fixed-dose combinations (ICS plus SABA, ICS plus LABD) were generally low in elderly patients with severe COPD.

In a study by Di Martino and colleagues, 34.8% of patients discharged from the hospital with a diagnosis of COPD were using LABD continuously. 18 Inpatient admissions for COPD exacerbations can put patients with COPD at a higher risk for repeated exacerbations and ultimately rehospitalization, 19 as well as for using greater healthcare resources and associated costs. 20 The under-utilization of COPD medications in our study adds to the current literature that has emphasized the importance of LABD treatment in reducing exacerbations leading to hospitalization.

The mean CCI scores were lower in the group that did not use COPD medication compared with the group that used COPD medication. These 2 scores were also lower in the group that did not use LABDs, although that group contained patients who used other COPD medications. This probably was because the number of patients who used other COPD medications (N = 439) in the group that did not use LABD was relatively small compared with the 1002 patients who did not fill a prescription for any COPD medications during the 180-day postindex period. Hence, the average CCI score in the group that did not use an LABD was still lower than that of the group that used an LABD.

Multiple logistic regression analyses also indicated that a lower CCI score was negatively associated with prescription fills for LABD and a COPD medication after the index hospitalization. These findings imply that patients with a lower comorbidity burden were less likely to be using COPD medications, and therefore, they did not receive adequate treatment for their disease state according to current guidelines. Inadequate control of overall health could lead to higher readmission rates in this population. Thus, patients with COPD who were hospitalized and had a higher risk for rehospitalization would benefit from a multidisciplinary approach and provider education in prescribing LABD treatment. 16,21,22

The prescription fill patterns in our study suggest that patients who were not using COPD maintenance medications before hospitalization continued to not fill a prescription for COPD medication after the index hospitalization. Multiple logistic regression analyses also indicated that not filling a prescription for an LABD or for at least 2 COPD medications before hospitalization was negatively associated with filling a prescription for an LABD and COPD medication, respectively, after hospitalization. This may be attributed to some physicians’ inertia in intensifying their patients’ medication regimen or to patients’ negative adaptation to change after shifting to a high-cost medication regimen if they had a fixed income. 24

In 2014, COPD medications within tiers 1 to 4 of the Medicare Advantage plan were available at a cost, with
copays ranging from $0 to $60. Although this cost may be minimal for some beneficiaries, the shared costs between the plan and the patient accumulate during the plan’s initial coverage. Once the total drug cost paid by the plan and the beneficiary reaches the initial coverage limit of $2850, the patient falls into the coverage gap. During this period, the patient pays the pharmacy 79% of the drug cost if the drug is classified as generic, and 47.5% of the drug cost if the drug is classified as brand name, until the out-of-pocket threshold is met. For example, in 2014 a patient could have purchased a $30 prescription for tiotropium but refuse to pay for the medication if its price suddenly increased to $406.11 monthly during the coverage gap (ie, the donut hole); the patient then was undertreated as a result. However, if the patient was prescribed ipratropium, a nonpreferred generic in the same formulary, the patient would have been charged $4 monthly, and $8.50 monthly during the coverage gap.

In addition to cost burden, complication and confusion regarding the use of inhalers—including but not limited to dry powder and pressurized metered-dose inhalers—are highly dependent on the inspiratory efforts and cognitive abilities of the patient. Therefore, if different types of COPD bronchodilator are not properly counseled by providers or made affordable to meet the physical and economic needs of the elderly, then suboptimal treatment for COPD could be expected in this population. Although a patient’s technique of using an inhaler and proper counseling about inhalers by healthcare providers are warranted, one of the deterrents to patient use is the cost of LABDs, which is beyond the provider’s control. The availability of the generic substitution of LABDs and understanding other barriers to prescribing or using LABDs would optimize patient COPD outcomes.

In our study, the use of an ICS before hospitalization was negatively associated with the use of an LABD posthospitalization, but it was not associated with the use of any COPD medications. This association may be related to the overuse of ICSs in the treatment of mild COPD, for which ICSs are not indicated. A recent study by Griffith and colleagues also recognized the issue of the inappropriate prescribing of ICSs, showing that poor inhalation technique led to unfavorable symptomatic control and ultimately to premature therapy escalation. Although the GOLD guidelines have recommended treatment with LABDs and ICSs in hospitalized patients with severe COPD, our study aligns with the current literature that recognizes the lack of treatment with LABD in these populations. Our results encourage the re-evaluation of treatment with LABDs and ICSs in patients with COPD with uncontrolled dyspnea and exacerbations. Healthcare providers should be discouraged from prescribing ICSs in newly diagnosed patients with COPD or in those with mild COPD. The de-escalation of ICS therapy must be considered in patients whose COPD status does not warrant treatment with ICSs to prevent the risk for pneumonia and medication overuse.

Limitations

These findings should be interpreted with certain limitations. First, the study focused on elderly patients with COPD in Texas-based Medicare Advantage plans, which contained a relatively small number of patients. However, we did try to impose strict inclusion and exclusion criteria to make a fair judgment of patients’ prescription fills. We required patients to have at least 1 outpatient diagnosis before the index hospitalization, although they could have had COPD well before the 12-month baseline period and did not need to have another diagnosis for filling their medications for COPD. Therefore, their first diagnosis of COPD in this Medicare Advantage plan could be during their first hospitalization.

In addition, our data did not confirm the different COPD risk treatment groups and did not assess how appropriate their treatment was to their classification. The GOLD guidelines suggest initiating maintenance therapy LABDs as soon as the patient is discharged, which is why in this study we focused on LABD therapy before and after hospital discharge. Because patients were all equally evaluated and were not stratified by COPD staging, the outcome of this study may not be generalizable to all populations with COPD, especially because worsening COPD can negatively affect drug utilization. However, we did use CCI score and CMS risk score to control for comorbidity burden.

When comparing any COPD prescription fill from the preindex to the postindex period, we did not evaluate the addition or discontinuation of medication therapy. The study portrays the ICS and PDE-4 groups as separate prescription fills, when those fills could have been interconnected with other prescription fills (ie, LABD or SABA use). We also did not evaluate the prescription fills for antibiotics, specifically macrolides such as azithromycin, which is suggested by the 2019 GOLD guidelines as a long-term therapy for patients with COPD with ≥1 moderate-to-severe exacerbations.

As with all claims data analysis, we were unable to interpret why a patient did not fill a prescription.

Finally, the 180-day time period before hospitalization has limited our study from understanding trials of, and nonresponse to COPD medication, by the beneficiaries. The patients in this study might have used COPD medications beyond the 180-day preindex period that was not captured in our study.
Conclusions

Our findings show that patients’ prescription fills for LABDs and other COPD medications increased after the index hospitalization, but the overall filling of COPD medication prescriptions in general, and specifically for LABDs, before and after hospitalization, was low in this cohort of elderly patients with COPD who were enrolled in Medicare Advantage plans in Texas. These findings reinforce that patients, especially those with low comorbidity burden, were not filling the prescriptions for medications needed to prevent the exacerbations of COPD. Furthermore, patients who did not use an LABD but used an ICS before hospitalization were less likely to fill a prescription for an LABD after hospitalization. These patients may need to de-escalate from ICS therapy and be reevaluated for the proper use of LABD for the management of COPD.

Future studies are needed to evaluate patients’ reasons for medication underutilization. Studies that assess the use of medications for COPD, as well as antibiotic use after COPD exacerbations, and evaluate the associations with hospital readmissions and mortality should also be considered.

Acknowledgment
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Author Disclosure Statement
Ms Xu, Dr Laxa, and Dr Sansgiry have no conflicts of interest to report; Dr Serna is an employee of CareAllies, a Cigna company.

References

Improving Medication Use for Chronic Diseases by Reducing Costs, Increasing Patient Adherence

By F. Randy Vogenberg, PhD, FASHP
Principal, Institute for Integrated Healthcare, and Board Chair, Employer-Provider Interface Council, Greenville, SC

**STAKEHOLDER PERSPECTIVE**

**PROVIDERS:** Medicare coverage represents a significant source of revenue and patients for healthcare providers. The management of chronic conditions constitutes key therapeutic strategies that rely heavily on the use of medications, so expanding our understanding of drug use in this population is important. Medicare Advantage plans have grown and are continuing to grow in popularity among Medicare-eligible patients. Medicare Advantage plans typically offer broad coverage of services and reduced or no-cost medications, depending on the geographic plan area. For chronic obstructive pulmonary disease (COPD), medication use remains a cornerstone of disease management, yet the sustained use of drugs and the appropriate use of short-acting versus long-acting therapies remains problematic in this patient population, as suggested in the study by Xu and colleagues. Future studies are needed on this subject, but the studies will need to reach beyond typical clinical metrics—based or traditional care visit–related outcomes to drive market-based solutions more effectively.

Despite the study limitations noted by Xu and colleagues, key trends in recent years continue to show a lack of progress in successfully addressing appropriate and sustained adherence with drugs for COPD. Such under- or misutilization of treatments needs to be addressed by healthcare providers as part of shared-risk arrangements with various Medicare plans that are currently on the market. Such collaboration and information sharing would be beneficial to all parties, especially patients in the Medicare population.

**PATIENTS:** Although the appropriate prescribing of medications has improved the ability to manage COPD better in elderly patients, patient adherence issues persist. Healthcare providers from multiple disciplines could work more effectively with their patients regarding appropriate medication use, but providers also need involvement from patients to manage their COPD effectively. Counterintuitively, health plans have made it easier to get low-cost or no-cost drugs in Medicare Advantage plans, but they have also raised patients’ deductibles, increased the use of tiers and coinsurance, or selected brand-name drugs based on other considerations that collectively have resulted in the underutilization of appropriate drugs by their members. Making coverage simpler, in addition to less costly, would be a welcomed change for patients to optimize the therapeutic outcomes that can lower the total costs of care and out-of-pocket expenses.

Further study of these cost and compliance issues needs to include the patient perspective and input from healthcare providers. Studies that examine different perspectives on these issues will further enhance the possibility of addressing the persistent long-term trend of medication nonadherence.

**PAYERS:** The study by Xu and colleagues has limitations, as is acknowledged by the investigators, yet it continues a long-time trend of medication use issues in the treatment of chronic diseases that have been increasingly managed with prescription medications. For plan sponsors who insure the risk of healthcare (ie, third-party insurance carriers, employers, unions, or municipalities), it remains important to balance the economics of drug coverage with clinical outcomes. Several shifts occurred over the years in Medicare and in commercial plans regarding what factors are driving coverage decisions beyond safety and efficacy.

Economic factors were diverting attention to the end goals of a plan sponsor that includes a fiduciary responsibility. Today, we are seeing a resurgence in consumerism and a shift in Medicare toward a more balanced fiscal approach that includes full transparency of economic considerations. How fast that transparency is implemented remains to be seen, as well as how factors, such as rebates, dissipate from coverage consideration, yet the importance of appropriate medication use remains significant.

The appropriate use of medication, including adherence, could have exaggerated effects on health plan performance and fiduciary responsibility in delivering the promise of the appropriate use of funds to support the health of a covered population. This type of strategy resonates today with third-party administrators and health plan sponsors, but may be lacking in pharmacy benefit managers who have no responsibility for risk or for the health of the population.